

UNITED STATES PATENT APPLICATION OF

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FOR

**COSMETIC COMPOSITIONS COMPRISING AN AMPHOTERIC STARCH AND A
CATIONIC CONDITIONER, AND USES THEREOF**

The present invention relates to novel cosmetic compositions comprising, in a cosmetically acceptable medium, at least one cationic conditioner and at least one amphoteric starch.

It is well known that hair that has been sensitized (i.e. damaged and/or embrittled) to varying degrees under the action of atmospheric agents or under the action of mechanical or chemical treatments, such as dyes, bleaches and/or permanent-waving, can be difficult to disentangle and to style, and may lack softness.

It has already been recommended to use conditioners, for example, cationic polymers or silicones, in compositions for washing or caring for keratin materials such as the hair, in order to facilitate the disentangling of the hair and to give it softness and suppleness. However, the cosmetic advantages mentioned above can be accompanied, on dried hair, by certain cosmetic effects considered undesirable, *i.e.*, lankness of the hairstyle (lack of lightness of the hair), and lack of smoothness (hair not uniform from the root to the end).

In addition, the use of cationic polymers for this purpose may have various drawbacks. On account of their high affinity for the hair, some of these polymers can become deposited thereon to a large extent during repeated use, and may lead to adverse effects such as an unpleasant, laden feel, stiffening of the hair and interfiber adhesion which may effect styling. These drawbacks may be more accentuated in the case of fine hair, which lacks liveliness and body.

In summary, it is found that the current cosmetic compositions containing conditioners are not always entirely satisfactory.

The inventors have discovered that the combination of at least one amphoteric starch defined below with at least one certain cationic conditioner makes it possible to overcome at least one of these drawbacks.

Thus, after considerable research conducted in this matter, the inventors have found that by introducing at least one amphoteric starch into compositions, such as hair compositions based on conditioners, it is possible to limit, or even eliminate, at least one of the problems generally associated with the use of such compositions, *i.e.*, for example, the lankness (charged feel following repeated applications) and the lack of smoothness and suppleness of the hair, while at the same time retaining at least one of the other advantageous cosmetic properties which are associated with conditioner-based compositions.

Moreover, when applied to the skin, for example in the form of a bubble bath or shower gel, the compositions of the invention can provide an improvement in the softness of the skin.

Thus, according to the present invention, a cosmetic composition is provided comprising, in a cosmetically acceptable medium, a) at least one amphoteric starch defined below, and b) at least one cationic conditioner chosen from polyquaternary ammonium polymers defined below, cationic silicones, quaternary ammonium salt surfactants, cyclopolymers of alkyldiallylamine, and cyclopolymers of dialkyldiallylammonium.

Another subject of the invention relates to the use of at least one amphoteric starch

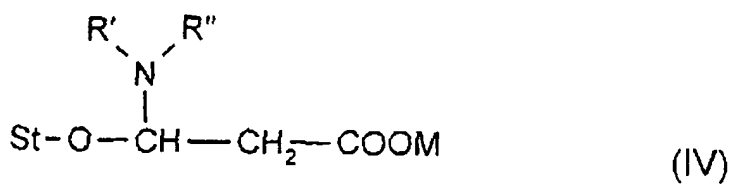
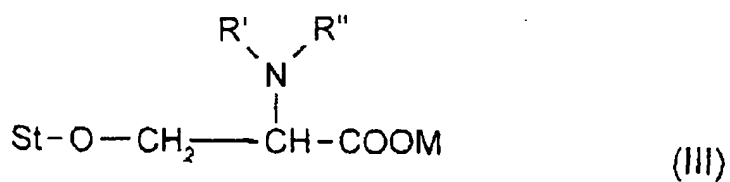
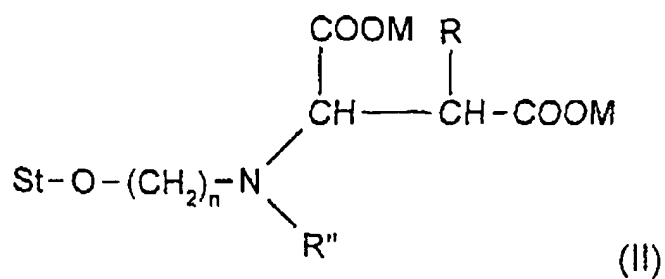
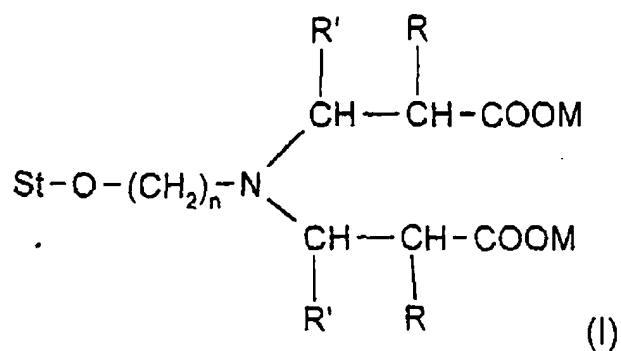
defined below in a cosmetic composition comprising at least one cationic conditioner chosen from polyquaternary ammonium polymers defined below, cationic silicones, quaternary ammonium salt surfactants, cyclopolymers of alkyldiallylamine, and cyclopolymers of dialkyldiallylammonium.

5 An additional subject of the invention relates to the use of at least one amphoteric starch defined below for the manufacture of a cosmetic composition comprising at least one cationic conditioner chosen from polyquaternary ammonium polymers defined below, cationic silicones, quaternary ammonium salt surfactants, cyclopolymers of alkyldiallylamine, and cyclopolymers of dialkyldiallylammonium.

10 Various subjects of the invention will now be described in detail. All of the meanings and definitions of the compounds used in the present invention given below are valid for all of the subjects of the invention.

15 As used herein, the term "conditioner" means any agent whose function is to improve at least one cosmetic property of the hair such as its softness, disentangling, feel, and static electricity.

 The composition according to the invention comprises at least one amphoteric starch chosen from the compounds of the following formulae:



wherein:

- St-O is a starch moiety;

- R, which may be identical or different, are each chosen from a hydrogen atom and a methyl group;

5 - R', which may be identical or different, are each chosen from a hydrogen atom, a methyl group, and a -COOH group;

- n is chosen from integers ranging from 2 to 3;

- M, which may be identical or different, are each chosen from a hydrogen atom, an alkali metal, an alkaline-earth metal (such as Na, K, and Li), NH₄, quaternary ammonium compounds, and organic amines; and

- R", which may be identical or different, are each chosen from a hydrogen atom and alkyl groups comprising from 1 to 18 carbon atoms.

These compounds are disclosed, for example, in U.S. Patent Nos. 5,455,340 and 4,017,460, the disclosures of which are incorporated herein by reference.

15 The starch moieties may, for example, be derived from any plant sources of starch such as, for example, corn, potato, oat, rice, tapioca, sorghum, barley and wheat. The starch hydrolysates mentioned above may also be used. For example, in one embodiment the starch is derived from potato.

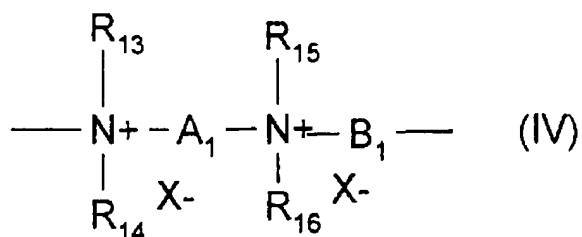
20 Certain embodiments of the present invention comprise the starches of formulae (I) and (II). Additional embodiments comprise starches modified with 2-chloroethyl-aminodipropionic acid, *i.e.*, the starches of formulae (I) and (II) in which R, R' and R"

represent a hydrogen atom and n is equal to 2.

The at least one amphoteric starch according to the invention can be used in the compositions in accordance with the present invention in amounts ranging for example from 0.01% to 10%, such as from 0.1% to 5% by weight, relative to the total weight of the composition.

The polyquaternary ammonium polymers are chosen from:

(1) diquaternary ammonium polymers comprising repeating units of formula:



wherein:

- R₁₃, R₁₄, R₁₅ and R₁₆, which may be identical or different, are each chosen from aliphatic groups comprising from 1 to 20 carbon atoms, alicyclic groups comprising from 1 to 20 carbon atoms, arylaliphatic groups comprising from 1 to 20 carbon atoms, lower hydroxyalkylaliphatic groups, and, additionally,

at least two of said R_{13} , R_{14} , R_{15} and R_{16} , with the nitrogen atoms to which they are attached, form at least one heterocycle optionally comprising an additional heteroatom other than nitrogen, and, additionally,

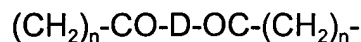
R_{13} , R_{14} , R_{15} and R_{16} , which may be identical or different, are each chosen from linear and branched C_1 - C_6 alkyl groups substituted with at least one group chosen from nitrile groups, ester groups, acyl groups, amide groups and groups chosen from groups of formulae $-CO-O-R_{17}-D$ and $-CO-NH-R_{17}-D$ wherein R_{17} is chosen from alkylene groups and D is chosen from quaternary ammonium groups;

- A_1 and B_1 , which may be identical or different, are each chosen from polymethylene groups comprising from 2 to 20 carbon atoms, chosen from linear and branched, saturated and unsaturated polymethylene groups, wherein said polymethylene groups may optionally comprise, optionally linked to and optionally intercalated in the main chain, at least one entity chosen from aromatic rings, oxygen atoms, sulfur atoms, sulfoxide groups, sulfone groups, disulfide groups, amino groups, alkylamino groups, hydroxyl groups, quaternary ammonium groups, ureido groups, amide groups and ester groups; and

- X^- is an anion chosen from anions derived from inorganic acids and anions derived from organic acids; and

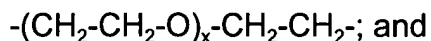
- A_1 , R_{13} and R_{15} may optionally form, together with the two nitrogen atoms to which they are attached, at least one piperazine ring;

- with the proviso that if A_1 is chosen from linear and branched, saturated and unsaturated alkylene groups and linear and branched, saturated and unsaturated hydroxyalkylene groups, B_1 may also be chosen from groups of formula:



5 wherein D is chosen from:

a) glycol residues of formula: -O-Z-O- , wherein Z is chosen from linear and branched hydrocarbon groups and groups chosen from groups of formulae:



10 wherein x and y, which may be identical or different, are each chosen from integers ranging from 1 to 4 (in which case x and y represent a defined and unique degree of polymerization) and any number ranging from 1 to 4 (in which case x and y represent an average degree of polymerization);

b) bis-secondary diamine residues such as piperazine derivatives;

15 c) bis-primary diamine residues chosen from residues of formula: -NH-Y-NH- , wherein Y is chosen from linear and branched hydrocarbon groups and residues of formula $\text{-CH}_2\text{-CH}_2\text{-S-S-CH}_2\text{-CH}_2\text{-}$; and

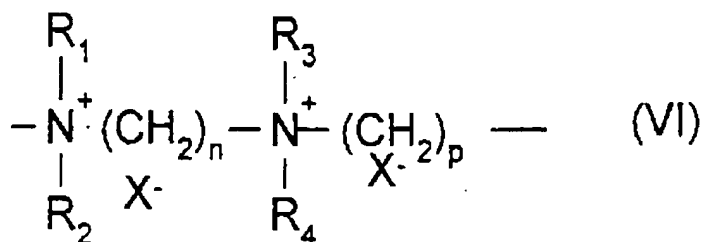
d) ureylene groups of formula: -NH-CO-NH- .

In one embodiment, X^- is an anion chosen from chloride atoms and bromide atoms.

20 According to the present invention, the quarternary diammonium polymers have a number-average molecular mass ranging for example from 1000 to 100,000.

For example, polymers of this type are described in French Patent Nos. 2,320,330, 2,270,846, 2,316,271, 2,336,434 and 2,413,907 and US Patent Nos. 2,273,780, 2,375,853, 2,388,614, 2,454,547, 3,206,462, 2,261,002, 2,271,378, 3,874,870, 4,001,432, 3,929,990, 3,966,904, 4,005,193, 4,025,617, 4,025,627, 4,025,653, 4,026,945 and 4,027,020, the disclosures of which are incorporated herein by reference.

Further, according to the present invention, polymers comprising repeating units of formula (VI) may be used:



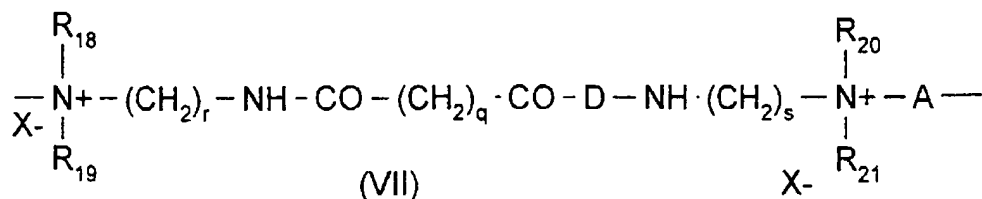
wherein:

- R₁, R₂, R₃ and R₄, which may be identical or different, are each chosen from alkyl groups comprising from 1 to 4 carbon atoms, and hydroxyalkyl groups comprising from 1 to 4 carbon atoms;
- n and p, which may be identical or different, are each chosen from integers ranging from 2 to 20; and

- X⁻ is an anion chosen from anions derived from inorganic acids and anions derived from organic acids.

In one embodiment, R₁, R₂, R₃ and R₄ are each a methyl group, n = 3, p = 6 and X = Cl. This unit is commonly known as hexadimethrine chloride according to INCI (CTFA) nomenclature.

(2) polyquaternary ammonium polymers comprising at least one unit of formula (VII):



wherein:

- R₁₈, R₁₉, R₂₀ and R₂₁, which may be identical or different, are each chosen from a hydrogen atom, a methyl group, an ethyl group, a propyl group, a β-hydroxyethyl group, a β-hydroxypropyl group, and a -CH₂CH₂(OCH₂CH₂)_pOH group, wherein p is an integer ranging from 0 to 6,

with the proviso that R₁₈, R₁₉, R₂₀ and R₂₁ are all not simultaneously a hydrogen atom;

- r and s, which may be identical or different, are each chosen from an integer ranging from 1 to 6;

- q is an integer ranging from 1 to 34;

- X⁻ is chosen from anions of inorganic and organic acids, such as a halide,

5 - D is chosen from direct bonds and $-(CH_2)_t-CO-$ groups, wherein t is 4 or 7,

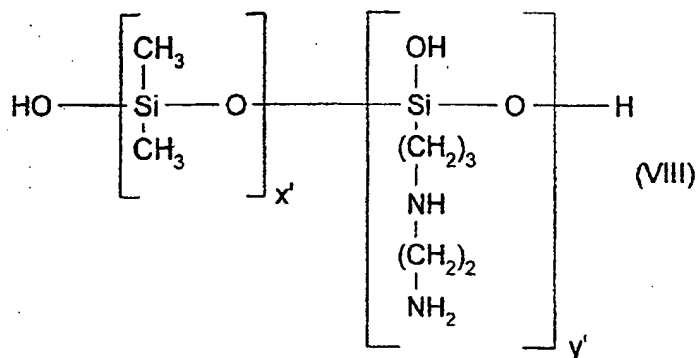
- A is chosen from dihalide groups, and a group of formula $-CH_2-CH_2-O-CH_2-CH_2-$.

For example, such compounds are described in patent application EP-A-122,324, the disclosure of which is incorporated by reference.

Non-limiting examples of the polyquarternary ammonium polymers are "Mirapol A 15", "Mirapol AD1", "Mirapol AZ1" and "Mirapol 175" sold by the company Miranol.

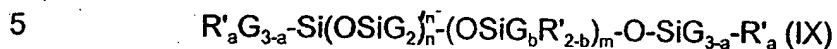
According to the present invention, the term "cationic silicone" denotes any silicone comprising at least one group chosen from primary amine groups, secondary amine groups, tertiary amine groups and quaternary ammonium groups. Non-limiting examples include:

15 (a) the polysiloxanes referred to in the CTFA dictionary as "amodimethicone" of formula:



wherein x' and y' are chosen from integers dependent on the molecular weight, such that the weight-average molecular weight ranges for example from 5,000 to 500,000;

(b) aminosilicones corresponding to the formula:



wherein:

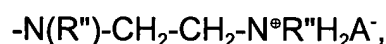
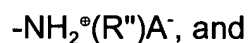
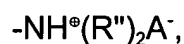
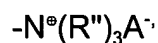
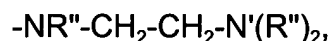
- G, which may be identical or different, are each chosen from a hydrogen atom, a phenyl group, a OH group, and C_1 - C_8 alkyl groups, for example a methyl group,

- a, which may be identical or different, are each chosen from an integer ranging from 0 to 3, for example 0,

- b is chosen from 0 and 1, for example, 1,

- m and n, which may be identical or different, are numbers such that the sum (n + m) can range from 1 to 2,000, such as from 50 to 150, wherein n may denote a number ranging from 0 to 1,999, such as from 49 to 149, and m may denote a number ranging from 1 to 2,000, such as from 1 to 10;

5 - R', which may be identical or different, are each chosen from monovalent groups of formula $-C_qH_{2q}L$ in which q is a number ranging from 2 to 8 and L is an optionally quaternized amine group chosen from the groups:

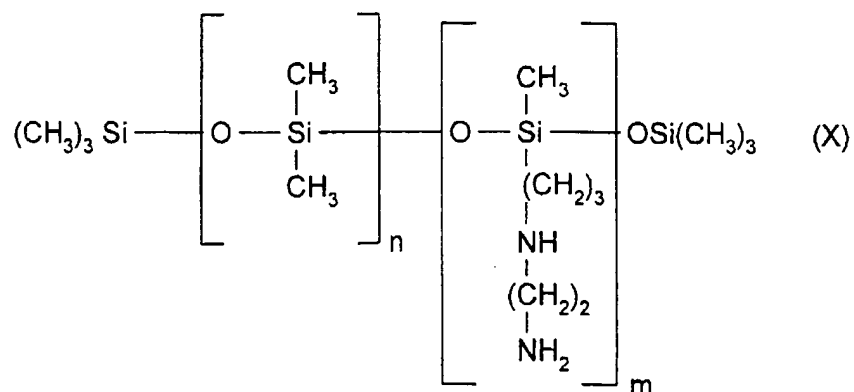


in which:

15 - R'', which may be identical or different, are each chosen from a hydrogen atom, a phenyl group, a benzyl group, and saturated monovalent hydrocarbon groups, such as an alkyl group comprising from 1 to 20 carbon atoms, and

- A⁻ is a halide ion such as, for example, an ion chosen from fluoride, chloride, bromide and iodide ions.

20 A product corresponding to this definition is the silicone known as "trimethylsilylamodimethicone", of formula:

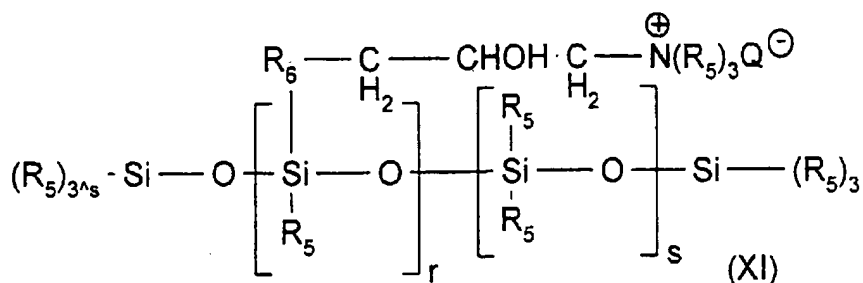


wherein:

- n and m have the meanings given above.

Such polymers are described for example in patent application EP-A-95238, the disclosure of which is incorporated herein by reference.

(c) aminosilicones of formula:



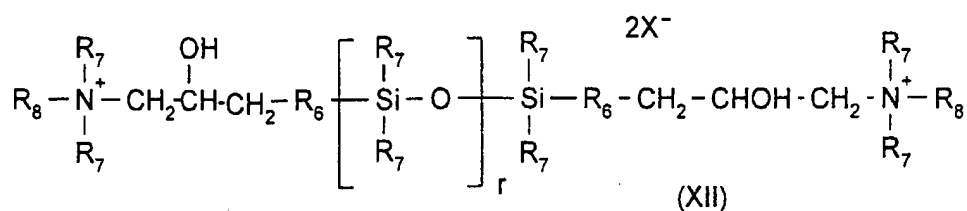
wherein:

- R_5 , which may be identical or different, are each chosen from monovalent hydrocarbon groups comprising from 1 to 18 carbon atoms, such as a group chosen from C_1 - C_{18} alkyl groups and C_2 - C_{18} alkenyl groups, for example a methyl group;
- R_6 is a divalent hydrocarbon group, such as a group chosen from C_1 - C_{18} alkylene groups and divalent C_1 - C_{18} groups, for example a C_1 - C_8 , alkyleneoxy group connected to the Si by an SiC bond;
- Q^- is chosen from anions such as halide ions, for example chloride ions, and organic acid salts (acetate, etc.);
- r is an average statistical value ranging from 2 to 20, such as from 2 to 8;
- s is an average statistical value ranging from 20 to 200, such as from 20 to 50.

Such aminosilicones are described in U.S. Patent No. 4,185,087, the disclosure of which is incorporated herein by reference.

A silicone which falls within this class is the silicone sold by the company Union Carbide under the name "Ucar Silicone ALE 56".

d) quaternary ammonium silicones of formula:



wherein:

- R_7 , which may be identical or different, are each chosen from monovalent hydrocarbon groups comprising from 1 to 18 carbon atoms, such as a C_1 - C_{18} alkyl groups, C_2 - C_{18} alkenyl groups, and rings comprising 5 to 6 carbon atoms. For example, R_7 can be a methyl group;

- R_6 , which may be identical or different, are each chosen from divalent hydrocarbon groups, such as C_1 - C_{18} alkylene groups and divalent C_1 - C_{18} groups, for example a C_1 - C_8 , alkyleneoxy group connected to the Si by an SiC bond;

- R_8 , which may be identical or different, are each chosen from a hydrogen atom, monovalent hydrocarbon groups comprising 1 to 18 carbon atoms, such as C_1 - C_{18} alkyl groups, C_2 - C_{18} alkenyl groups and groups of formula $-R_6-NHCOR_7$;

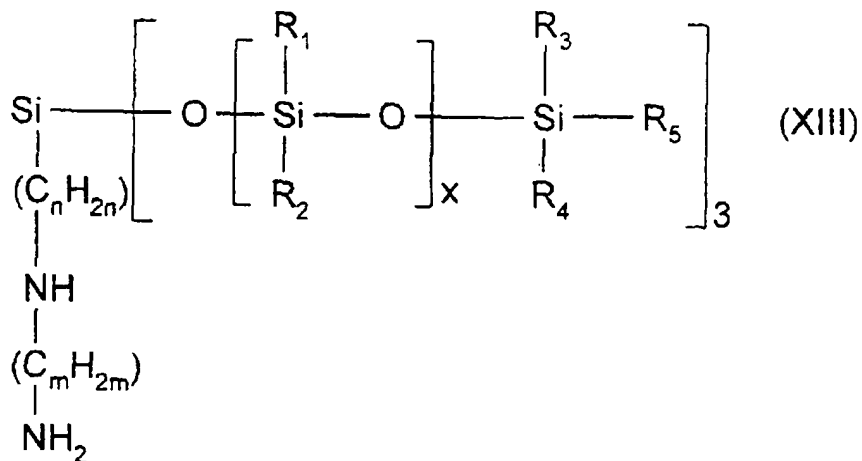
- X^- is chosen from anions such as halide ions, for example chloride ions, and organic acid salts (acetate, etc.);

- r is an average statistical value ranging from 2 to 200, such as from 5 to 100.

These silicones are described, for example, in application EP-A-0,530,974, the disclosure of which is incorporated herein by reference.

Other non-limiting examples of these silicones are silicones sold by the company Goldschmidt under the names Abil Quat 3270, Abil Quat 3272 and Abil Quat 3474.

e) aminosilicones of formula (XIII):



wherein:

- R_1 , R_2 , R_3 and R_4 , which may be identical or different, are each chosen from C_1 - C_4

5 alkyl groups and a phenyl group,

- R_5 is chosen from C_1 - C_4 alkyl groups and a hydroxyl group,

- n is an integer ranging from 1 to 5,

- m is an integer ranging from 1 to 5, and

- x is chosen such that the amine number ranges for example from 0.01 to 1 meq/g.

According to the present invention, the aminosilicones can be in the form of at least one composition chosen from oils, aqueous solutions, alcoholic solutions, and aqueous-alcoholic solutions, in the form of dispersions and emulsions.

5 In one embodiment of the present invention, for example, the aminosilicones can be in the form of emulsions, such as in the form of microemulsions and nanoemulsions.

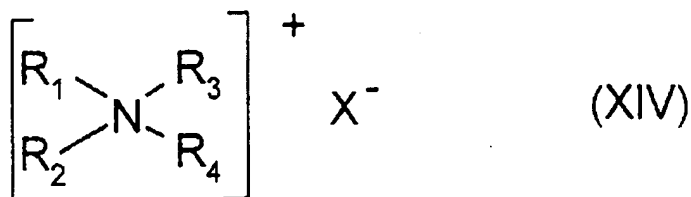
For example, the product sold under the name "Cationic Emulsion DC 929" by the company Dow Corning, which comprises, besides amodimethicone, a cationic surfactant derived from tallow fatty acids, referred to as tallowtrimonium (CTFA), in combination with a nonionic surfactant, known under the name "Nonoxynol 10", can be used.

In another example, the product sold under the name "Cationic Emulsion DC 939" by the company Dow Corning, which comprises, besides amodimethicone, a cationic surfactant, trimethylcetylammmonium chloride, in combination with a nonionic surfactant, trideceth-12, can be used.

15 Another commercial product which can be used according to the present invention is the product sold under the name "Dow Corning Q2 7224" by the company Dow Corning, comprising the trimethylsilylamodimethicone of formula (X), a nonionic surfactant of formula: $C_8H_{17}-C_6H_4-(OCH_2CH_2)_n-OH$ in which $n = 40$, also known as octoxynol-40, another nonionic surfactant of formula: $C_{12}H_{25}-(OCH_2-CH_2)_n-OH$ in which $n = 6$, also known as
20 isolaureth-6, and glycol.

The cationic quaternary ammonium salt surfactants according to the present invention may, for example, be chosen from:

A) quaternary ammonium salts of formula (XIV) below:



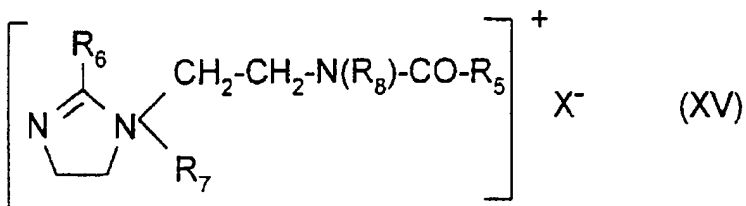
in which:

- the radicals R_1 , R_2 , R_3 , and R_4 , which may be identical or different, are independently chosen from linear and branched aliphatic radicals comprising from 1 to 30 carbon atoms, and aromatic radicals, such as C_6 - C_{20} aromatic radicals (for example, aryl and alkylaryl), wherein the aliphatic radicals can comprise hetero atoms such as, oxygen, nitrogen, sulfur and halogens, and wherein the aliphatic radicals are chosen, for example, from alkyl, alkoxy, polyoxy(C_2 - C_6)alkylene, alkylamide, (C_{12} - C_{22})alkylamido(C_2 - C_6)alkyl, (C_{12} - C_{22})alkylacetate and hydroxyalkyl radicals, comprising from 1 to 30 carbon atoms;

- X^- is an anion chosen from halides, phosphates, anions derived from organic acids, (C_2 - C_6)alkyl sulfates, alkyl sulfonates, and alkylaryl sulfonates.

The compounds of formula (XIV) can be chosen from, for example, (a) compounds comprising at least two fatty aliphatic radicals comprising from 8 to 30 carbon atoms, (b) compounds comprising at least one fatty aliphatic radical comprising from 17 to 30 carbon atoms, and (c) compounds comprising at least one aromatic radical.

- 5 B) Quaternary ammonium salts of imidazolinium, such as, for example, the salts of formula (XV) below:



in which:

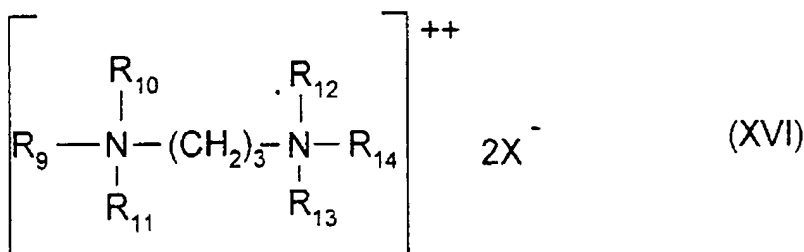
- 10 - R₅ is chosen from alkenyl and alkyl radicals comprising from 8 to 30 carbon atoms, for example radicals derived from tallow fatty acid,
- R₆ is chosen from a hydrogen atom, C₁-C₄ alkyl radicals, and alkenyl and alkyl radicals comprising from 8 to 30 carbon atoms,
- R₇ is chosen from C₁-C₄ alkyl radicals,
- 15 - R₈ is chosen from a hydrogen atom and C₁-C₄ alkyl radicals,

- X⁻ is an anion chosen from halides, phosphates, acetates, lactates, alkyl sulfates, alkyl sulfonates, and alkylaryl sulfonates.

For example, R₅ and R₆, which may be identical or different, are independently chosen from alkenyl and alkyl radicals comprising from 12 to 21 carbon atoms, for example, radicals derived from tallow fatty acid, R₇ is methyl, and R₈ is hydrogen.

Such products are, for example, (1) Quaternium-27 (International Cosmetic Ingredient Dictionary and Handbook, hereafter "CTFA", 1997), i.e., "Rewoquat" W75, W75PG, and W90, and (2) Quaternium-83 (CTFA 1997), i.e., "Rewoquat" W75HPG, which are sold by the company Witco.

C) Diquaternary ammonium salts of formula (XVI):



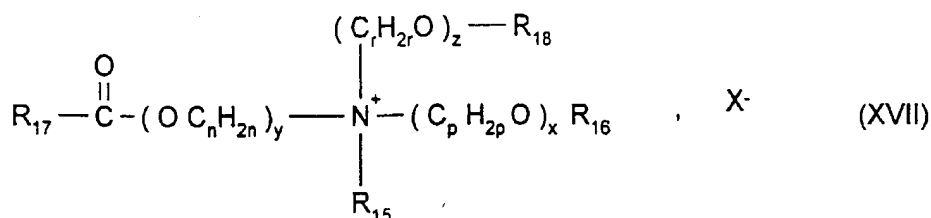
in which:

- R₉ is chosen from aliphatic radicals comprising from 16 to 30 carbon atoms,

- R_{10} , R_{11} , R_{12} , R_{13} and R_{14} , which may be identical or different, are independently chosen from a hydrogen atom and alkyl radicals comprising from 1 to 4 carbon atoms, and
- X^- is an anion chosen from halides, acetates, phosphates, nitrates and methyl sulfates.

5 For example, such diquaternary ammonium salts can comprise propane tallow diammonium dichloride.

D) Quaternary ammonium salts comprising at least one ester function. The quaternary ammonium salts comprising at least one ester function that can be used according to the present invention are, for example, those of formula (XVII) below:

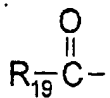


in which:

- R_{15} is chosen from C_1 - C_6 alkyl radicals and C_1 - C_6 hydroxyalkyl and C_1 - C_6 dihydroxyalkyl radicals;

- R_{16} is chosen from:

(i) acyl groups of the following formula:



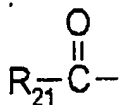
wherein R₁₉ is defined below,

(ii) linear and branched, saturated and unsaturated, C₁-C₂₂ hydrocarbon-based radicals, and

5 (iii) a hydrogen atom;

- R₁₈ is chosen from:

(i) acyl groups of the following formula:



10 wherein R₂₁ is defined below,

(ii) linear and branched, saturated and unsaturated, C₁-C₆ hydrocarbon-based radicals, and

(iii) a hydrogen atom;

- R₁₇, R₁₉ and R₂₁, which may be identical or different, are independently chosen from linear and branched, saturated and unsaturated, C₇-C₂₁ hydrocarbon-based radicals;

- n, p and r, which may be identical or different, are independently chosen from integers ranging from 2 to 6;

- y is an integer ranging from 1 to 10;

- x and z, which may be identical or different, are independently chosen from integers ranging from 0 to 10;

- X^- is chosen from simple and complex, organic and inorganic anions;

provided that the sum $x + y + z$ is from 1 to 15, and that when x is 0, then R_{16} is chosen from linear and branched, saturated and unsaturated, C_1 - C_{22} hydrocarbon-based radicals, and that when z is 0, then R_{18} is chosen from linear and branched, saturated and unsaturated, C_1 - C_6 hydrocarbon-based radicals.

In one embodiment of the present invention, the R_{15} alkyl radicals may be linear and branched and further, for example, linear.

For example, R_{15} may be chosen from a methyl group, an ethyl group, a hydroxyethyl group, and a dihydroxypropyl radical, and further for example from a methyl group and an ethyl group.

The sum $x + y + z$ may for example range from 1 to 10.

When R_{16} is chosen from linear and branched, saturated and unsaturated, C_1 - C_{22} hydrocarbon-based radicals, R_{16} may be long and comprise from 12 to 22 carbon atoms, or short and comprise from 1 to 3 carbon atoms.

When R_{18} is chosen from linear and branched, saturated and unsaturated, C_1 - C_6 hydrocarbon-based radicals, R_{18} may for example comprise from 1 to 3 carbon atoms.

R_{17} , R_{19} and R_{21} , which may be identical or different, can, for example, be independently chosen from linear and branched, saturated and unsaturated C_{11} - C_{21}

hydrocarbon-based radicals, and for example from linear and branched, saturated and unsaturated, C₁₁-C₂₁ alkyl and alkenyl radicals.

x and z, which may be identical or different, can for example independently be chosen from 0 or 1.

5 y for example may be equal to 1.

n, p and r, which may be identical or different, can for example be independently chosen from 2 and 3 and in one embodiment equal to 2.

The anion for example can be chosen from halides (chloride, bromide, and iodide) and alkyl sulfates, such as methyl sulfate. However, methanesulfonate, phosphate, nitrate, tosylate, anions derived from organic acids, such as acetate and lactate, and any other anions compatible with the ammonium comprising an ester function, may be used.

As a further example, the anion X⁻ can be chosen from chloride and methyl sulfate.

Further examples of ammonium salts of formula (XVII) are those in which:

- R₁₅ is chosen from a methyl group and an ethyl group,
- x and y are equal to 1;
- z is equal to 0 or 1;
- n, p and r are equal to 2;
- R₁₆ is chosen from:



wherein R_{19} is defined below,

(ii) a methyl group, an ethyl group, and C_{14} - C_{22} hydrocarbon-based groups, and

(iii) a hydrogen atom;

- R_{18} is chosen from:

(i) acyl groups $R_{21}-\overset{\overset{O}{\parallel}}{C}-$

- wherein R_{21} is defined below,

(ii) a hydrogen atom;

- R_{17} , R_{19} and R_{21} , which may be identical or different, are independently chosen from linear and branched, saturated and unsaturated, C_{13} - C_{17} hydrocarbon-based radicals, such as from linear and branched, saturated and unsaturated C_{13} - C_{17} alkyl and alkenyl radicals.

The hydrocarbon-based radicals can for example be linear.

Representative compounds of formula (XVII) are chosen from diacyloxyethyl-dimethylammonium, diacyloxyethylhydroxyethylmethylammonium, monoacyloxyethyldihydroxyethylmethylammonium, triacyloxyethylmethylammonium and monoacyloxyethylhydroxyethyldimethylammonium salts (for example chloride and methyl sulfate). The acyl radicals can comprise for example from 14 to 18 carbon atoms and can for example be obtained from plant oils, such as palm oil and sunflower oil. When the

compound comprises several acyl radicals, these radicals, which may be independently chosen, may independently be identical or different.

These products are obtained, for example, by direct esterification of compounds chosen from triethanolamine, triisopropanolamine, alkyldiethanolamines and
5 alkyldiisopropanolamines, which are optionally oxyalkylenated, with fatty acids or with fatty acid mixtures of plant or animal origin, and by transesterification of the methyl esters thereof. This esterification is followed by a quaternization using an alkylating agent such as alkyl halides (such as methyl and ethyl halides), dialkyl sulfates (for example dimethyl and diethyl sulfates), methyl methanesulfonate, methyl para-toluenesulfonate, glycol
10 chlorohydrin and glycerol chlorohydrin.

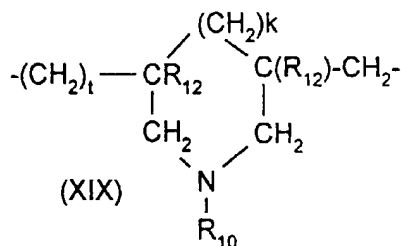
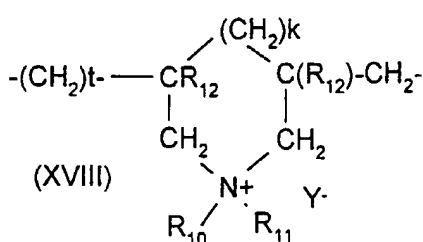
Such compounds are sold, for example, under the names Dehyquat by the company Henkel, Stepanquat by the company Stepan, Noxamium by the company Ceca and Rewoquat WE 18 by the company Rewo-Witco.

It is also possible to use the ammonium salts comprising at least one ester function,
15 described in U.S. Patent Nos. 4,874,554 and 4,137,180, the disclosures of which are incorporated by reference herein.

Representative quaternary ammonium salts of formula (XIV) include tetraalkylammonium chlorides such as, for example, dialkyldimethylammonium chlorides and alkyltrimethylammonium chlorides, in which the alkyl radical comprises from 12 to 22
20 carbon atoms, for example behenyltrimethylammonium chloride, distearyltrimethylammonium chloride, cetyltrimethylammonium chloride, and

benzyldimethylstearylammmonium chloride, and, stearamidopropyldimethyl(myristyl acetate)ammmonium chloride sold under the name "Cepharyl 70" by the company Van Dyk.

Cyclopolymers of alkyldiallylamine and cyclopolymers of dialkyldiallylammmonium, such as homopolymers and copolymers comprising, as the main constituent of the chain, at least one unit chosen from units of formulae (XVIII) and (XIX):



wherein:

- k and t, which may be identical or different, are each chosen from 0 and 1, with the proviso that the sum of k + t is equal to 1;

- R₁₂, which may be identical or different, are each chosen from a hydrogen atom and a methyl group;

- R₁₀ and R₁₁, which may be identical or different, are each chosen from alkyl groups comprising from 1 to 22 carbon atoms, hydroxyalkyl groups wherein the alkyl group

optionally comprises from 1 to 5 carbon atoms, lower C₁-C₄ amidoalkyl groups, and, additionally,

R₁₀ and R₁₁, together with the nitrogen atom to which they are commonly attached, form at least one heterocyclic group, such as piperidyl groups and morpholinyl groups;

5 - Y⁻ is an anion, such as bromide, chloride, acetate, borate, citrate, tartrate, bisulfate, bisulfite, sulfate and phosphate. For example, such polymers are described in French patent 2,080,759 and in its Certificate of Addition 2,190,406, the disclosures of which are incorporated herein by reference.

10 In one embodiment of the present invention, R₁₀ and R₁₁, which may be identical or different, are each chosen from alkyl groups comprising from 1 to 4 carbon atoms.

Non-limiting examples of the polymers defined above include the dimethyldiallyl-ammonium chloride homopolymer sold under the name "Merquat 100" by the company Calgon (and its homologues of low weight-average molecular mass) and copolymers of diallyldimethylammonium chloride and of acrylamide, sold under the name "Merquat 550".

15 In certain embodiments of the present invention, combinations of conditioners are used.

20 According to the present invention, the at least one cationic conditioner may be present in amounts ranging for example from 0.001% to 10% by weight, such as from 0.01% to 5% by weight, and further such as from 0.1% to 3% by weight, relative to the total weight of the final composition.

The compositions of the present invention can also comprise at least one surfactant chosen from anionic, amphoteric and nonionic surfactants, which is present in an amount ranging for example from 0.1% to 60% by weight relative to the total weight of the composition, such as from 3% to 40%, and further such as from 5% to 30%.

5 The at least one surfactant chosen from anionic, amphoteric and nonionic surfactants, which is suitable for carrying out the present invention can, for example, include the following:

(i) Anionic surfactant(s):

Representative anionic surfactants include salts (for example alkaline salts, such as sodium salts, ammonium salts, amine salts, amino alcohol salts and magnesium salts) of the following compounds: alkyl sulfates, alkyl ether sulfates, alkylamidoether sulfates, 10 alkylaryl polyether sulfates, monoglyceride sulfates; alkyl sulfonates, alkyl phosphates, alkylamide sulfonates, alkylaryl sulfonates, α -olefin sulfonates, paraffin sulfonates; alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates; alkyl 15 sulfosuccinamates; alkyl sulfoacetates; alkyl ether phosphates; acyl sarcosinates; acyl isethionates and N-acyltaurates. The alkyl and acyl radicals of all of these various compounds can for example comprise from 8 to 24 carbon atoms, and the aryl radicals can for example be chosen from phenyl and benzyl groups.

For example, anionic surfactants can be chosen from fatty acid salts such as the salts of oleic, ricinoleic, palmitic and stearic acids, coconut oil acid and hydrogenated 20

coconut oil acid and acyl lactylates in which the acyl radical comprises from 8 to 20 carbon atoms. At least one weakly anionic surfactant can also be used, such as alkyl-D-galactosiduronic acids and their salts, as well as polyoxyalkylenated (C₆-C₂₄) alkyl ether carboxylic acids, polyoxyalkylenated (C₆-C₂₄) alkylaryl ether carboxylic acids, polyoxyalkylenated (C₆-C₂₄) alkylamido ether carboxylic acids and their salts, for example, those comprising from 2 to 50 ethylene oxide groups.

As a further example, the anionic surfactant can be at least one salt chosen from alkyl sulfate salts and alkyl ether sulfate salts.

(ii) Nonionic surfactant(s):

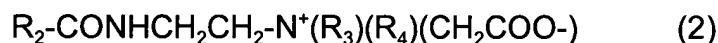
Useful nonionic surfactants include compounds that are well known per se (see for example in this respect "Handbook of Surfactants" by M.R. Porter, published by Blackie & Son (Glasgow and London), 1991, pp. 116-178), the disclosure of which is incorporated by reference herein. Thus, nonionic surfactants can include polyethoxylated, polypropoxylated and polyglycerolated fatty acids, alkylphenols, α -diols and alcohols having a fatty aliphatic chain comprising, for example, 8 to 18 carbon atoms, it being possible for the number of ethylene oxide and propylene oxide groups to range for example from 2 to 50 and for the number of glycerol groups to range for example from 2 to 30. Mention may also be made of copolymers of ethylene oxide and of propylene oxide, condensates of ethylene oxide and of propylene oxide with fatty alcohols; polyethoxylated fatty amides for example comprising from 2 to 30 mol of ethylene oxide, polyglycerolated fatty amides comprising on average 1

to 5, such as from 1.5 to 4, glycerol groups; oxyethylenated fatty acid esters of sorbitan comprising from 2 to 30 mol of ethylene oxide; fatty acid esters of sucrose, fatty acid esters of polyethylene glycol, alkylpolyglycosides, N-alkylglucamine derivatives, amine oxides such as (C₁₀-C₁₄)alkylamine oxides and N-acylaminopropylmorpholine oxides.

5 (iii) Amphoteric surfactant(s):

Representative amphoteric surfactants include surfactants chosen from aliphatic secondary and aliphatic tertiary amine derivatives in which the aliphatic radical is chosen from linear and branched chain radicals comprising 8 to 22 carbon atoms and comprising at least one water-soluble anionic group (chosen for example from carboxylate, sulfonate, sulfate, phosphate and phosphonate); mention may also be made of (C₈-C₂₀)alkylbetaines, sulfobetaines, (C₈-C₂₀)alkylamido(C₁-C₆)alkylbetaines and (C₈-C₂₀)alkylamido(C₁-C₆)alkylsulfobetaines.

Representative amine derivatives include the products sold under the name Miranol, as described in US patents 2,528,378 and 2,781,354, the disclosures of which are incorporated by reference herein, and having the structures:



in which:

- R₂ is chosen from alkyl radicals derived from an acid R₂-COOH present in hydrolysed coconut oil, heptyl, nonyl and undecyl radicals,
- R₃ is chosen from a β-hydroxyethyl group, and

- R_4 is chosen from a carboxymethyl group;

and



in which:

5 - (B) is $\text{-CH}_2\text{CH}_2\text{OX'}$, with X' chosen from a $\text{-CH}_2\text{CH}_2\text{-COOH}$ group and a hydrogen atom,

 - (C) is $\text{-(CH}_2\text{)}_z\text{-Y'}$, with $z = 1$ or 2 , and with Y' chosen from -COOH and $\text{-CH}_2\text{-CHOH-SO}_3\text{H}$ radicals,

 - R_5 is chosen from alkyl radicals, such as (a) alkyl radicals of an acid $R_5\text{-COOH}$ present in oils chosen from coconut oil and hydrolysed linseed oil, (b) alkyl radicals, such as C_7 , C_9 , C_{11} and C_{13} alkyl radicals, and (c) C_{17} alkyl radicals and the iso forms, and unsaturated C_{17} radicals.

Such representative compounds are classified in the CTFA dictionary, 5th edition, 1993, under the names disodium cocoamphodiacetate, disodium lauroamphodiacetate, disodium caprylamphodiacetate, disodium capryloamphodiacetate, disodium cocoamphodipropionate, disodium lauroamphodipropionate, disodium caprylamphodipropionate, disodium capryloamphodipropionate, lauroamphodipropionic acid, and cocoamphodipropionic acid.

By way of example, mention may be made of the cocoamphodiacetate sold under the trade name Miranol C2M Concentrate by the company Rhône-Poulenc.

In the compositions in accordance with the present invention, at least two surfactants of different types can be used. Representative compositions include compositions comprising (a) more than one anionic surfactant, (b) at least one anionic surfactant and at least one amphoteric surfactant, and (c) at least one anionic surfactant and at least one nonionic surfactant. In one embodiment, the composition can comprise at least one anionic surfactant and at least one amphoteric surfactant.

The at least one anionic surfactant used for example, can be chosen from (C_{12} - C_{14})alkyl sulfates of sodium, of triethanolamine and of ammonium; (C_{12} - C_{14})alkyl ether sulfates of sodium, of triethanolamine and of ammonium, oxyethylenated with 2.2 mol of ethylene oxide; sodium cocoyl isethionate; and sodium (C_{14} - C_{16})- α -olefin sulfonate, and used in combination with an amphoteric surfactant chosen from:

- amphoteric surfactants such as the amine derivatives known as disodium cocoamphodipropionate and sodium cocoamphopropionate, sold for example by the company Rhône-Poulenc under the trade name "Miranol C2M Conc®" as an aqueous solution comprising 38% active material, and under the name Miranol C32; and
- amphoteric surfactants of zwitterionic type, such as alkylbetaines, for example the cocobetaine sold under the name "Dehyton AB 30" as an aqueous solution comprising 32% AM by the company Henkel.

The composition of the present invention may also comprise at least one additive chosen from thickeners (chosen from associative and non-associative thickeners), fragrances, nacreous agents, preserving agents, silicone sunscreens, non-silicone

sunscreens, vitamins, provitamins, cationic polymers (in addition to cationic polymers disclosed above), amphoteric polymers, anionic polymers, nonionic polymers, proteins, protein hydrolysates, 18-methyleicosanoic acid, hydroxy acids, panthenol, volatile silicones, non-volatile silicones, cyclic silicones, linear silicones, crosslinked silicones, modified silicones and non-modified silicones, and any other additive conventionally used in cosmetics which does not affect the properties of the compositions according to the invention.

These additives may be present in the composition according to the present invention in amounts ranging for example from 0% to 20% by weight relative to the total weight of the composition. The amount of each additive can be determined by those skilled in the art depending on its nature and its function.

The compositions according to the present invention have a final pH ranging for example from 2 to 10, such as from 3 to 6.5. The pH can be adjusted to the desired value by adding at least one base (chosen from organic and inorganic bases) to the composition, such as bases chosen from aqueous ammonia and primary, secondary and tertiary (poly)amines for example monoethanolamine, diethanolamine, triethanolamine, isopropanolamine and 1,3-propanediamine. The pH can also be adjusted to the desired value by adding at least one acid, such as a carboxylic acid such as, for example, citric acid.

The compositions in accordance with the present invention may be used for washing and treating keratin materials such as the hair, the skin, the eyelashes, the eyebrows, the nails, the lips and the scalp, for example, the hair.

The compositions according to the present invention may comprise rinse-out and
5 leave-in conditioner compositions.

The compositions according to the present invention may further comprise detergent compositions such as shampoos, shower gels and bubble baths and may also include make-up-removing products. In these embodiments of the present invention, the compositions comprise a washing base comprising at least one surfactant, wherein the washing base is generally aqueous.

The at least one surfactant optionally comprising the washing base may be chosen from the anionic, amphoteric and nonionic surfactants as defined above.

The quantity and quality of the washing base affords the final composition satisfactory foaming and detergent power.

The washing base may be present in an amount ranging for example from 4% to
15 50% by weight, such as from 6% to 35% by weight, and further such as from 8% to 25% by weight, relative to the total weight of the final composition.

Another subject of the present invention is a process for treating keratin materials such as the skin and the hair, which comprises applying a cosmetic composition as defined
20 above to the keratin materials and then optionally rinsing it out with water.

This process according to the present invention allows, for example, maintenance of the hairstyle and treatment of, care of, washing of, and removal of make-up from the skin, the hair and any other keratin material.

5 The compositions of the present invention may also be in the form of at least one composition chosen, for example, from permanent-waving, straightening, dyeing and bleaching compositions. The compositions of the present invention may also be in the form of at least one rinse-out composition which may be applied before and after dyeing, and during bleaching, permanent-waving and straightening the hair. The compositions of the present invention may also be applied between steps of permanent-waving and hair-straightening operations.

10 The compositions according to the present invention may also be in the form of at least one lotion chosen from aqueous and aqueous-alcoholic lotions for skin care and hair care.

15 The cosmetic compositions according to the present invention may, for example, be in the form of at least one composition chosen from gels, milks, creams, emulsions, thickened lotions and mousses, and may, for example, be used for the skin, the nails, the eyelashes, the lips and the hair.

20 The compositions may be packaged in various forms, such as in vaporizers, pump-dispenser bottles and in aerosol containers in order to, for example, ensure application of the composition in vaporized form or in the form of a mousse. Such packaging forms are

indicated, for example, when it is desired to obtain a spray, a lacquer or a mousse for treating the hair.

In all of the text hereinabove and hereinbelow, the percentages expressed are on a weight basis.

5 Unless otherwise indicated, all numbers expressing quantities of ingredients, properties such as molecular weight, reaction conditions, and so forth used in the specification and claims are to be understood as being modified in all instances by the term "about." Accordingly, unless indicated to the contrary, the numerical parameters set forth in the following specification and attached claims are approximations that may vary
10 depending upon the desired properties sought to be obtained by the present invention. At the very least, and not as an attempt to limit the application of the doctrine of equivalents to the scope of the claims, each numerical parameter should at least be construed in light of the number of reported significant digits and by applying ordinary rounding techniques.

15 Notwithstanding that the numerical ranges and parameters setting forth the broad scope of the present invention are approximations, the numerical values set forth in the specific examples are reported as precisely as possible. Any numerical value, however, inherently contain certain errors necessarily resulting from the standard deviation found in their respective testing measurements.

20 Non-limiting examples illustrating the present invention are given below. In the examples, AM means active material.

EXAMPLE 1

A rinse-out conditioner in accordance with the invention, having the composition below, was prepared:

Composition	Invention A	B
Potato starch modified with 2-chloroethylaminodipropionic acid neutralized with sodium hydroxide (Structure Solanace from National Starch)	1.5 g	1.5 g
Diallyldimethylammonium chloride homopolymer as an aqueous solution comprising 40% AM (Merquat 100 from Calgon)	0.5 g AM	
Amphoteric polymer: Terpolymer of diallyldimethylammonium chloride, of acrylic acid and of acrylamide as an aqueous solution comprising 40% AM (Merquat 3300 from Calgon)	-	0.5 g AM
Demineralized water qs	100.0 g	100.0 g

These compositions were applied to washed and drained hair. They were left to stand on the hair for 2 minutes and were then rinsed off with water.

The hair treated with composition A according to the invention was smoother and more supple when wet and had more body and was lighter when dry than the hair treated with composition B.

EXAMPLE 2

5 A rinse-out conditioner in accordance with the invention, having the composition below, was prepared:

- potato starch modified with 2-chloroethylaminodipropionic acid neutralized with sodium hydroxide (Structure Solanace from National Starch) 1.5 g
- combination of myristyl, cetyl and stearyl myristate, palmitate and stearate 0.5 g
- amodimethicone sold as a cationic emulsion comprising 35% active material (Fluid DC 939 from Dow Corning) 1.4 g AM
- behenyltrimethylammonium chloride as an aqueous solution comprising 80% AM (Genamin KDMP from Clariant) 1.2 g AM
- combination of cetyl alcohol and stearyl alcohol (50/50 by weight) 2.5 g
- lauryldimethicone copolyol comprising 91% AM

(Q2-5200 from Dow Corning)	0.23 g AM
- citric acid	0.1 g
- fragrance, preserving agents	qs
- water	qs 100 g

- 5 The hair treated with the composition according to the invention was smooth and supple when wet and had body and was light when dry.

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EXAMPLE 3

A shampoo in accordance with the invention, having the composition below, was prepared:

Sodium lauryl ether sulfate (70/30 C12/C14) comprising	15.5 g AM
2.2 mol of ethylene oxide	
Cocoylbetaine as an aqueous solution comprising 32%	3 g AM
A.M.	
Hydroxypropyl guar trimethylammonium chloride, sold	0.1 g
under the name Jaguar C13S by the company Rhodia	
Potato starch modified with 2-chloroethylaminodipropionic	0.3 g
acid neutralized with sodium hydroxide (Structure Solanace	
from National Starch)	
Polydimethylsiloxane of kinematic viscosity 60,000 cSt	2.7 g
Amodimethicone as a cationic emulsion comprising 35%	1.05 g AM
AM (DC939 from Dow Corning)	
1-(Hexadecyloxy)-2-octadecanol/cetyl alcohol mixture	2.5 g
Coconut monoisopropanolamide	0.5 g
Preserving agents, fragrance	qs
Citric acid	qs
pH	5.5
Demineralized water	100 g
qs	

Shampooing was carried out by applying 12 g of the composition to hair that had been moistened beforehand. The shampoo was worked into a lather and was then rinsed thoroughly with water.

The hair treated with this composition was soft, light and disentangled easily.

EXAMPLE 4

A rinse-out conditioner in accordance with the invention, having the composition below, was prepared:

- potato starch modified with 2-chloroethylaminodipropionic acid neutralized
with sodium hydroxide (Structure Solanace from
National Starch) 1 g
- combination of myristyl, cetyl and stearyl
myristate, palmitate and stearate 0.5 g
- cationic emulsion comprising 67% AM of
copolymer of polydimethylsiloxane comprising
a,w-vinyl groups/polydimethylsiloxane
comprising a,w-hydrogeno groups (DC-1997
from Dow Corning) 1.4 g AM
- behenyltrimethylammonium chloride as an
aqueous solution comprising 80% AM
(Genamin KDMP from Clariant) 1.2 g AM
- combination of cetyl alcohol and stearyl
alcohol (50/50 by weight) 3 g
- lauryldimethicone copolyol comprising 91% AM
(Q2-5200 from Dow Corning) 0.23 g AM
- citric acid 0.1 g

- fragrance, preserving agents qs
- water qs 100 g

EXAMPLE 5

A rinse-out conditioner in accordance with the invention, having the composition below, was prepared:

- potato starch modified with 2-chloroethylaminodipropionic acid neutralized with sodium hydroxide (Structure Solanace from National Starch) 1 g
- candelilla wax 0.3 g
- N-oleoyldihydrosphingosine 0.1 g
- trimethylsilyl amodimethicone as a nonionic emulsion comprising 20% AM 0.92 g AM
- behenyltrimethylammonium chloride as an aqueous solution comprising 80% AM (Genamin KDMP from Clariant) 0.88 g AM
- quaternium-87 comprising 75% AM in propylene glycol (Rewoquat PG 75 from Rewo) 2.5 g AM
- Stearyl alcohol 1 g
- oxyethylenated sorbitan monolaurate 0.3 g
- quaternized wheat protein hydrolysate 0.06 g

- fragrance, preserving agents qs
- water qs 100 g